I.   DEVELOPMENT OF 2000 SECTION 303(d) LIST

BACKGROUND

Section 303(d) of the 1972 Federal Clean Water Act requires the listing of all waters that do not meet all applicable water quality standards once all conventional water pollution control practices are in place in the watershed, and further requires states to estimate total maximum daily loads (TMDLs) permissible for each of these waters. Thus Section 303(d) acts as an oversight clause in the Federal Clean Water Act to provide the needed level of protection to streams not adequately protected by other portions of the Clean Water Act or other state or federal laws. Section 303(d) in its entirety appears as Appendix A.

In Missouri, the Section 303(d) list is formed in the following manner. From September through November of every odd numbered year, all available water quality data with acceptable quality assurance is reviewed for compliance with applicable water quality standards by the Water Pollution Control Program of the Department of Natural Resources. Waters found not to be in compliance with these standards are listed in a biennial state water quality report. This report, called the 305(b) Report after the section of the federal Clean Water Act which requires it, represents the most complete list that the Department of Natural Resources has been able to document of the state′s waters not meeting water quality standards.

The Section 303(d) list is in general a subset of the waters reported in the 305(b) data as not meeting water quality standards. The 2000 Missouri 303(d) list also contains certain waters for which there was little hard data documentation of a problem, but for which staff felt a significant water quality concern had been identified making it worthy of 303(d) listing.

In general waters reported under section 305(b) as Threatened (presently provides beneficial use support but may drop to partial attainment), Partial use support (at least one beneficial use affected), and Nonsupport (at least one beneficial use lost) are subject to listing under section 303(d). EPA guidance is followed for classifying waters into these section 305(b) categories. Waterbodies listed as not meeting water quality standards in the 305(b) submission will appear on the 303(d) list for the purpose of TMDL development unless a waterbody falls into one or more of the following categories:

1.   Inadequate data quality or quantity. Data may be acceptable for providing an overview of water quality for the 305(b) submission but may be insufficiently conclusive (due to quality assurance level, age or other factors) to formally classify the water as impaired. These waters would be the subject of additional water quality monitoring to better determine whether or not they exceed state water quality standards. Some of these waters are listed in Category Two of the section 303(d) list, which will focus additional monitoring on these waters to determine more precisely their status with regard to meeting water quality standards. If findings confirm impairment they will be listed in Category One for TMDL development in subsequent lists.

2.   Conventional treatment or water pollution control facilities or practices not in place. This would include waterbodies not meeting standards because of old, overloaded or poorly operated and maintained wastewater treatment facilities, or other facilities or sites that have caused exceedence of instream water quality standards due to failure to fully comply with regulations pertaining to the protection of water quality. These waters are listed in Category One of the 303(d) list, although the department will pursue the rigorous application of technological solutions to the point sources noted and conduct additional monitoring to determine if that resolves the problem. If that does not occur, the water will be subsequently scheduled for TMDL development. For planning purposes these waters are listed as low priority with latter dates for TMDL development.

3.   Where water quality impairment is caused by naturally occurring conditions, the water is listed in Category Three. In Missouri, the most common problem due to natural conditions is levels of dissolved manganese in exceedence of drinking water standards relating to taste, odor or staining of laundry. This category also contains waters where the source of the contaminants is very low concentrations of man-made toxicants such as chlordane in sediments or polynuclear aromatic hydrocarbons (PAHs) in water and sediments that would be extremely difficult to effectively remediate.

The Section 303(d) list, in deference to concerns expressed by the Federal Advisory Committee assisting USEPA in developing guidelines for implementation of Section 303(d), is composed of three lists of waters.

HISTORY OF 303(d) ACTIVITIES IN MISSOURI

Missouri began requiring studies to predict effluent limits for large point sources necessary to protect instream water quality standards in the mid 1970's. These studies were referred to as Waste Load Allocation Studies (WLAs). Forty-three of these studies have been completed, and with the possible exception of eight where sources other than the wastewater discharge addressed by the WLA may contribute to exceedences of water quality standards, these studies meet the criteria of Total Maximum Daily Load (TMDL) studies. Five additional TMDLs are now in progress or are scheduled to begin in 1999. These studies are listed in Appendix F.

DATA QUALITY AND QUANTITY REQUIREMENTS

This section discusses data quality and quantity requirements used by staff for preparing the list waterbodies on the 303(d) list. The USEPA has instituted and requested that states use a data quality coding system for classifying water quality data. The code is a single digit number from one to four, indicating the degree of assurance the user has in the accuracy of a particular piece of environmental data. Level One indicates the least assurance and Level Four the greatest. Based on EPA s guidance, the Missouri DNR has assigned a quality code to all data reviewed since the guidance appeared in 1995, in the following manner:

Level One: - Small amounts of chemical data of demonstrated quality, qualitative sampling of invertebrates or fish, visual observation of streams. This includes university and agencies data as well as data reported by volunteers that have successfully demonstrated adequate quality assurance at a state-sponsored quality assurance workshop. In Missouri, the primary purpose of Level One data is to provide a rapid and inexpensive method of screening large numbers of waterbodies for obvious water quality problems and to determine where more intensive monitoring is needed.

Level Two: - Larger amounts of chemical data of demonstrated quality, generally sufficient to characterize typical water quality. This would include sites with 20-50 chemical analyses and also intensive studies which monitor several nearby sites repeatedly over short periods of time.
- Fish tissue analysis.

Level Three: - Large amounts of chemical data of demonstrated quality extending over many years and providing data on a wide variety of water quality constituents including heavy metals and pesticides.
- Biological studies of at least one major component of the aquatic flora and fauna (fish, invertebrates or algae).
- Toxicity testing studies.

Level Four: - Biological studies of two or more major components of the aquatic flora and fauna.

In the preparation of the state 305(b) submission, data from all four data quality levels are used. Most of the data is of Level One quality, and without Level One data staff would not be able to assess a majority of the state s waters.

In selecting waterbodies for the 303(d) list, only Level Two or higher data are used, unless the problem can be accurately characterized by Level One data[1]. The reason is that Level Two data provides a higher level of assurance that a water quality standard is actually being exceeded and that a TMDL study is necessary. All waterbodies appearing in the 305(b) report but excluded from the 303(d) list due to inadequate data, receive high priority for additional monitoring so that data quality is upgraded to at least Level Two. The schedule for this monitoring is attached as Appendix D.

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[1] Data with a low sample variance may accurately characterize water quality conditions with a relatively small number of samples.

Data collected by volunteers trained by DNR has a quality code rating of Level One if the volunteer has attained a Volunteer QA/QC rating of 2 or 3. If the volunteer has not successfully passed a level 2 workshop, their data does not have an EPA data quality code. All data submitted by volunteers is included in a state database specifically for volunteer data. Volunteers with a level 2 or 3 QA/QC rating that monitor a specific site at least three times in a two year period have that data analyzed and results summarized in the main state data base that DNR uses to assess the state's waters for impairment.

During 1998-1999 monitoring data from 117 sites was submitted to DNR by 51 volunteers and was used in making the biennial state water quality assessment.

PRIORITIZATION CRITERIA

Within the first paragraph of section 303(d), in addition to requiring a list of impaired waters, the statute also requires a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The following section of this document describes how priorities among the section 303(d) waters are selected.

Actual impairments rank high or medium, threatened impairments rank medium or low, and impairments that are not well documented rank low, except as noted below in Criteria 4.

Actual impairments related to human health are ranked high, for example pesticides or metals in drinking water supply or contaminants in fish.

Waters with multiple use impairments are ranked high.

Actual aesthetic impairments rank low.

The degree of treatability is used to differentiate high and medium priorities with actual impairments and between medium and low priorities for threatened impairments.

With regard to the number of beneficial uses impaired, all classified waters in Missouri are protected for at least three beneficial uses: livestock and wildlife watering, protection of aquatic life and human consumption of fish. In addition, some waters are protected for other uses if those uses are expected of particular waters. These other uses include drinking water supply, irrigation, and whole body contact recreation (swimming, water skiing).

With regard to treatability of the impairment, some water quality problems are more amenable to being successfully treated than others. In addition, some problems are inherently more expensive to treat than others and some problems have economic impacts only at a very local scale while others will affect regional economies. Last, some water quality problems can be treated with economic consequences only, but for others there will be environmental trade-offs as well.

Treatability is classified as follows:

Problem is very amenable to treatment without environmental trade-offs, with most costs related to

initial treatment requirements and only modest maintenance and operation costs. Examples: (a) Controlling erosion of most lead mine tailings piles, (b) removal of sawdust piles.

Problem is very amenable to treatment without environmental trade-offs, and with relatively low cost for initial treatment requirements, but maintenance and operation or other economic consequences may be substantial at the local scale. Examples: (a) elimination of ORVs (off-road vehicles) from sensitive areas in state parks, (b) reducing the impact of large trail rides on streams, (c) herbicide reduction in small drinking water reservoir watersheds, and (d) nutrient/ toxics reduction from point sources or urban nonpoint sources.

Problem is very amenable to treatment. Maintenance and operational costs may be substantial and may have significant economic consequences at the local scale. Environmental trade-offs are likely but not necessarily a serious problem. Example: elimination of in-channel gravel dredging and requiring gravel removal from nonflowing areas or from the floodplain.

Problem is very amenable to treatment with minor, if any, environmental trade-offs, but may have significant regional economic consequences. Examples: (a) altering the operation of large hydropower dams, (b) herbicide or pesticide reduction or substitution in large drinking water reservoir watersheds, (c) substantial restrictions on confined animal manure land application rates and location.

Problem is amenable to treatment but treatment costs and environmental trade-offs may exceed value of water quality improvement. Example: (a) treatment of acidified/mineralized emerging groundwater from mined lands would require the construction and operation of expensive water treatment plants which would generate significant amounts of waste sludge which would require landfilling. (b) removal of chlordane and other toxic chemicals from sediments of streams and lakes would likely cause damage to instream and riparian habitats during the removal and would require landfilling of potentially large volumes of contaminated sediments.

Problem is very difficult to treat. Example: (a) reduction of taste and odor problems caused by algae in drinking water reservoirs. Some improvement may be gained if significant reductions in nitrogen and phosphorus levels in the lake can be made. However, algal growth and accompanying taste and odor problems can occur even in lakes with modest nutrient levels. Thus to some degree the problem is inherent in using a reservoir as a water supply.

Source(s) of the water quality impairment, and hence treatability, is at present, unknown.

The water quality problem has no practical solution. Example: secondary (aesthetic) drinking water standards in some northeast Missouri streams are exceeded due to naturally occurring levels of manganese in these streams. The problem is due to the natural rates of weathering of minerals. These waters may be the subject of continued monitoring and assessment activities. It is questionable whether the standard is attainable.

To better characterize kinds of problems and the degree to which they have been documented, the 303(d) list is divided into three categories. Category One 303(d) waters are a subset of the 305(b) waters that have been held to a higher level of data quality and quantity than 305(b) waters and are clearly in need of TMDL studies. Category Two waters are primarily 305(b) waters for which the

water quality problem is less well documented and for which monitoring supporting further documentation of the problem will receive high priority. Category Three waters are 305(b) waters for which the treatment of the problem is either impossible or would cause other environmental problems as serious as the present problems. Most Category One TMDLs would be completed between 1999 and 2007, most Category Two waters are scheduled for monitoring from 2001 through 2008, with TMDLs, as needed, to be completed between 2008 and 2012.

Category Three waters are waters impaired by naturally occurring contaminants or by very low levels of man-made organic compounds, where it is physically difficult to take any action that would effectively address the impairment. In the case of naturally occurring contaminants, there is no practical way to remove the contaminants. For chlordane and PAHs, the low level of contamination and the widespread area with those sediments may make any attempt at remediation both expensive and possibly cause more damage than continuing to manage the problem through administrative means such as fish consumption advisories.